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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,275	09/22/2003	Koichi Wago	146712004300	5466

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EXAMINER

ANGEBRANDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,275

Applicant(s)

WAGO, KOICHI

Examiner

Martin J. Angebranndt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6 and 8-19 is/are pending in the application.
- 4a) Of the above claim(s) 8-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. The response of the applicant to the restriction requirement has been received and made of record. Rejections of the prior art not repeated below are withdrawn in view of the arguments and amendment of the applicant. Response to arguments directed at remaining rejections are presented after the first rejection to which they are directed.

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-7, drawn to an interference exposure apparatus, classified in class 359, subclass 35.
- II. Claims 8-10, drawn to a master magnetic disk, classified in class 360, subclass 135.
- III. Claims 11-15, drawn to a photolithographic process for forming a magnetic master, classified in class 430, subclass 320.
- IV. Claims 16-19, drawn to using a metal contact master for magnetic contact printing, classified in class 360, subclass 17.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions group I and group II are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a materially different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the master may be made using convention photolithographic (non-interferometric) processes or electron beam lithography.

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4. Inventions group I and group III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the process does not require a rotary stage and the apparatus can be used to form other grating patterns, such as hologons/optical scanning discs and an embossing master for replicating these in polymers/resins.
5. Inventions group I and group IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions the processes and apparatus of the groups are not related and incapable of being used together/simultaneously.
6. Inventions group III and group II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the master may be made using convention photolithographic (non-interferometric) processes or electron beam lithography.
7. Inventions group II and group IV are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that

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product. See MPEP § 806.05(h). In the instant case the master can be used as an embossing master for replicating patterns in polymers/resins. (ie no magnetic field need be applied)

8. Inventions group III and group IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the processes of the groups are not related and incapable of being used together/simultaneously.

9. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification and because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

10. A telephone call was made to Raj Dave' on March 21, 2006 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In

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either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

11. Applicant's election without traverse of group I in the reply filed on 04/28/2006 is acknowledged.

Claims 8-19 are withdrawn.

12. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because The details cannot be seen. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

The details of figure 3 and 4 cannot be resolved. The applicant may wish to introduce a higher quality version of these figures in place of those of record. If the applicant decides on a photograph, then a petition is necessary.

The applicant did not address this and the examiner repeats the requirement.

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. JP 58-094149, in view of Anderson et al. '385.

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Sakai et al. JP 58-094149 teaches with respect to figure 3, a laser the beam of which is divided into parts using a beams splitter (6), two mirrors (7a,7b) are used to reflect the sub-beams, so they overlap and they are expanded in diameter using (8a,8b) to fill the aperture field of the slit in the mask (12) and the holder (11) is rotated to form concentric circles in the resist coated substrate (10) as shown in figure 1. The formula describing the fringe period as a function of wavelength and angle of separation of the beams appears in the lower left hand column of page 2. The pitches appear to be in the range of 0.1 to 10 microns (page 2, upper right column).

Anderson et al. '385 teach the formula describing the fringe period as a function of wavelength and angle of separation of the beams (1/25). The use of an Argon Ion laser (351 nm) as the recording laser to form the pattern in the resist is disclosed. (2/60-66). The phase shifter (19) in figure 1, is disclosed as enabling active stabilization of the fringes for increased accuracy in the fringes formed (2/67-3/25, 3/43-59, 4/55-5/12).

Sakai et al. JP 58-094149 does not describe a particular wavelength, which is dominant force in defining the pitch or feature size. It would have been obvious to one skilled in the art to modify the apparatus of Sakai et al. JP 58-094149 by using blue/UV lasers known to be useful in forming grating patterns in photosensitive materials, such as the 351 nm Ar ion laser, which can form features with pitches of as small as ~175 nm and with the phase shifter able to provide increased stabilization of the fringes as taught by Anderson et al. '385 with a reasonable expectation of forming a useful tracking/servo groove or pattern.

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The use of the shorter wavelength laser and the ability to stabilize the fringes, provides additional support for the inherent ability to form the fringes with a small pitch (below 350 nm) with the increased accuracy due to the fringe stabilization.

The applicant argues the shape of the slit, but this is not recited in the claims. The aperture is introduced, but is not described as an arc until claim 4. The term arc is not limited to the ellipse shown in the figures of the instant application. Therefore the position argued is not commensurate with the scope of coverage sought. Further there is no data in the record evidencing the criticality of the mask shape. The fringe stabilization by the phase shifter in one arm of the interferometer, not the shape of the mask is what provides the increased accuracy of the pattern (standard deviation of less than 1 nm). The means for achieving this and the desirability of it in forming grating patterns is already appreciated in the prior art as evidenced by Anderson et al. '385 and the desirability of higher pattern accuracy in the resist pattern formed using the apparatus of Sakai et al. JP 58-094149 is recognized, so one of ordinary skill in the art would add the phase shifter to the apparatus of Sakai et al. JP 58-094149. The use of an elliptical mask in grating formation is evidenced by Debesis '025. The shape of the mask may control the evenness of the exposure across the radius of the disk, but this would be limited to particular shapes and proportions relative to the radius of the disk. The rejection stands.

15. Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. JP 58-094149, in view of Anderson et al. '385, further in view of Debesis '443 or Debesis '025.

Debesis '443 teaches a mask where the aperture describes an arc of the disk, where the inner and outer edges are curved.

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Debasis '025 teaches the use of an elliptical aperture to control the grating exposure.

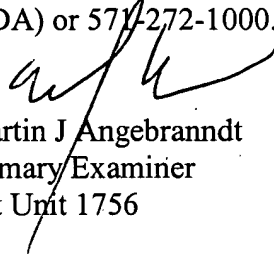
In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the apparatus resulting from the combination of Sakai et al. JP 58-094149 and Anderson et al. '385 by using other masking shapes to optimize the exposure as disclosed by Debasis '443 or Debasis '025 with a reasonable expectation of forming a useful exposure apparatus.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Martin J Angebrannt
Primary Examiner
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11/13/2006